IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
TYLER DIVISION

INTEL CORPORATION, et al., **Plaintiffs,** **v.** **COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION,** **Defendant.**	§	**Civil No. 6:06-cv-551**
MICROSOFT CORP., et al., **Plaintiffs,** **v.** **COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION,** **Defendant.**	§	**Civil No. 6:06-cv-549**
COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION, **Plaintiff,** **v.** **TOSHIBA AMERICA INFORMATION SYSTEMS, INC., et al.,** **Defendants.**	§	**Civil No. 6:06-cv-550**

MEMORANDUM OPINION AND ORDER
REGARDING SUPPLEMENTAL CLAIM CONSTRUCTION

Before the Court is the Commonwealth Industrial and Scientific Research Organization's (CSIRO's) Motion for Summary Judgment of Infringement (6:06-cv-549, Docket No. 384; 6:06-cv-550, Docket No. 450; 6:06-cv-551, Docket No. 333) ("MSJ"). After review of the motion and

responses, it is apparent to the Court that the parties have raised claim construction disputes that were not raised during the Claim Construction hearing, but nevertheless need to be resolved prior to trial. Accordingly, the Court provides the following supplemental claim construction to resolve these issues prior to trial. In light of these supplemental claim constructions, CSIRO's MSJ is **DENIED AS MOOT,** but the Court will revisit the issues raised therein at an appropriate time during trial in light of the evidence and arguments presented.

BACKGROUND

The relevant facts and an explanation of the technology of these cases have been fully set forth in this Court's August 14, 2008 claim construction opinion. *See* Memorandum Opinion and Order, 6:06-cv-551, Docket No. 254 ("Claim Construction Opinion"). These three cases all involve U.S. Patent No. 5,487,069 (the "'069 Patent"). The cases have been consolidated for jury trial on all issues of liability. Following the close of discovery, CSIRO moved for summary judgment against Defendants,[1] claiming that no reasonable jury could find that Defendants did not infringe. The parties' briefing on this issue raise several new (or at least re-argued) claim construction issues, which need to be resolved by the Court. Accordingly, the Court resolves these claim construction issues as stated below.

APPLICABLE LAW

"It is a 'bedrock principle' of patent law that 'the claims of a patent define the invention to which the patentee is entitled the right to exclude.' " *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc) (quoting *Innova/Pure Water Inc. v. Safari Water Filtration Sys.*, Inc., 381 F.3d 1111, 1115 (Fed. Cir. 2004)). When the parties raise an actual dispute regarding the scope of

[1] For ease of reference, all parties other than CSIRO will be referred to as "Defendants."

these claims then the court, not the jury, has a duty to resolve that dispute. *O2 Micro Intern. Ltd. v. Beyond Innovation Technology Co.*, Ltd., 521 F.3d 1351, 1360 (Fed. Cir. 2008).

In claim construction, courts examine the patent's intrinsic evidence to define the patented invention's scope. *See id.*; *C.R. Bard, Inc. v. U.S. Surgical Corp.*, 388 F.3d 858, 861 (Fed. Cir. 2004); *Bell Atl. Network Servs., Inc. v. Covad Commc'ns Group, Inc.*, 262 F.3d 1258, 1267 (Fed. Cir. 2001). This intrinsic evidence includes the claims themselves, the specification, and the prosecution history. *See Phillips*, 415 F.3d at 1314; *C.R. Bard, Inc.*, 388 F.3d at 861. Courts give claim terms their ordinary and accustomed meaning as understood by one of ordinary skill in the art at the time of the invention in the context of the entire patent. *Phillips*, 415 F.3d at 1312-13; *Alloc, Inc. v. Int'l Trade Comm'n*, 342 F.3d 1361, 1368 (Fed. Cir. 2003).

The claims themselves provide substantial guidance in determining the meaning of particular claim terms. *Phillips*, 415 F.3d at 1314. First, a term's context in the asserted claim can be very instructive. *Id.* Other asserted or unasserted claims can also aid in determining the claim's meaning because claim terms are typically used consistently throughout the patent. *Id.* Differences among the claim terms can also assist in understanding a term's meaning. *Id.*

Additionally, "claims 'must be read in view of the specification, of which they are a part.'" *Id.* (quoting *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995) (en banc)). "[T]he specification 'is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.'" *Id.* (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)); *Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1325 (Fed. Cir. 2002). This is true because a patentee may define his own terms, give a claim term a different meaning than the term would otherwise possess, or disclaim or

disavow the claim scope. *Phillips*, 415 F.3d at 1316.

Where a claim limitation is expressed in "means plus function" language and does not recite definite structure in support of its function, the limitation is subject to 35 U.S.C. § 112, ¶ 6. *Braun Med., Inc. v. Abbott Labs.*, 124 F.3d 1419, 1424 (Fed. Cir. 1997). In relevant part, 35 U.S.C. § 112, ¶ 6 mandates that "such a claim limitation 'be construed to cover the corresponding structure . . . described in the specification and equivalents thereof.'" *Id.* (citing 35 U.S.C. § 112, ¶ 6). Accordingly, when faced with means-plus-function limitations, courts "must turn to the written description of the patent to find the structure that corresponds to the means recited in the [limitations]." *Id.*

Construing a means-plus-function limitation involves multiple inquiries. "The first step in construing [a means-plus-function] limitation is a determination of the function of the means-plus-function limitation." *Medtronic, Inc. v. Advanced Cardiovascular Sys., Inc.*, 248 F.3d 1303, 1311 (Fed. Cir. 2001). Once a court has determined the limitation's function, "the next step is to determine the corresponding structure disclosed in the specification and equivalents thereof." *Id.* A "structure disclosed in the specification is 'corresponding' structure only if the specification or prosecution history clearly links or associates that structure to the function recited in the claim." *Id.* Moreover, the focus of the "corresponding structure" inquiry is not merely whether a structure is capable of performing the recited function, but rather whether the corresponding structure is "clearly linked or associated with the [recited] function." *Id.*

APPLICATION

Means to Apply [a] Data Reliability Enhancement (the "DRE limitation")

Claims 10, 26, and 42 contain the term "means to apply [a] data reliability enhancement"

("DRE"). The Court's previous construction of this term specified that its function was "to apply a data reliability enhancement to said data passed to said modulation means" and its corresponding structure was the "rate ½ TCM (trellis coded modulation) encoder described in block 42 of Figure 7 and referenced at column 6:32-46." Claim Construction Opinion at 18, 21, 32. The parties' dispute at the time of that opinion was only whether the "corresponding structure includes a convolutional encoder." *Id.* at 19. While the Court stated that "the specification does not disclose as corresponding structure a convolutional encoder as part of the "rate ½ TCM encoder (42)," the Court did not decide whether a convolutional encoder was equivalent to or could be a part of a "rate ½ TCM encoder." *Id.* at 20. The Court only held that "the corresponding structure for the 'means to apply [a] data reliability enhancement' is the rate ½ TCM [] encoder described in block 42 of Figure 7 and referenced at column 6:32-46." Claim Construction Opinion at 21.

CSIRO now contends in its MSJ that a "rate ½ TCM encoder" must include only a convolutional encoder. Defendants respond that a TCM encoder must include an integrated finite-state encoder (providing a coding function) and a non-binary modulator (providing a mapping function). This dispute raises the new claim construction issue of whether the patent describes the "rate ½ TCM encoder (42)" as having only a coding function or integrated coding and mapping functions. As Figure 7 does not specifically describe the contents of Block 42 or the function of a rate ½ TCM encoder, one must look to the specification and its contextual relationship with Figure 7.

As generally used in a multi-level transmission system, Trellis Coded Modulation schemes integrate a modulation scheme (mapping) with a coding scheme (finite-state coding). The coding scheme expands m bits into m+1 bits (i.e., a binary rate = m/m+1). For example, a rate ½ encoder

will take one bit of input and expand it into two bits of output. Typically, a convolutional encoder is used to expand the bits. The term "trellis" refers to the ability to describe TCM schemes by a state-transition ("trellis") diagram. The coding scheme is a digital function and the modulation scheme is an analog function. The coding scheme implements Forward Error Correction ("FEC"), which provides data reliability enhancement. The modulation scheme puts the data into a particular form for transmission. Though TCM schemes "usually" or "typically" contain both coding functions and mapping functions, that fact is not dispositive. *See Honeywell Int'l, Inc. v. Universal Avionics Sys. Corp.*, 493 F.3d 1358 (Fed. Cir. 2007) ("A claim term may be defined in a particular manner for purposes of a patent even without an explicit statement of redefinition.").

Here, the patent's context and specification provide an abundance of evidence that the corresponding structure for the purposes of determining § 112, ¶ 6 equivalence is a rate ½ finite-state encoder regardless of any mapping function. First, Block 42 in Figure 7 is shown to be upstream of "quadrature phase-shift keying (QPSK) encoder (44)." '069 Patent at Figure 7. Because a QPSK encoder also performs a mapping function (i.e. mapping binary bits to phase changes in an analog carrier signal), this indicates to one skilled in the art that the "42" encoder does not include its own mapping function.

Additionally, immediately following the "42" encoder is "di-bit interleaver (43)." A di-bit interleaver reorders a bit-stream. Defendants' experts, Dr. Bim and Dr. Williams, both cite to a paper (Bim Exh. 9) by Li and Sun, which diagrams both TCM and bit-interleaved coded modulation (BIMC) forms of orthogonal frequency-division multiplexing ("OFDM") wireless local-area network ("LAN") transceivers. As shown in Figure 2 of that paper, the output of the TCM encoder is applied to a "symbol interleaver," which provides an output to the OFDM channel. This is consistent with

the general view that TCM performs a mapping function and outputs a symbol stream, but is inconsistent with Figure 7 showing the TCM encoder (42) output being applied to a di-*bit* interleaver. If mapping is included in TCM encoder (42), a symbol interleaver rather than a bit interleaver would be shown.

Further, the specification links the DRE function to Forward Error Correction ("FEC") and then links FEC only to coding. *See* '069 Patent at 8:9-14, 9:36-46. There is no mention of a mapping function playing a role in FEC or DRE. In fact, after completely describing Figure 7 and similar embodiments, the specification notes that "[i]t is also possible to use combined coding and modulation schemes such as trellis-coded-modulation (TCM) to give improved bandwith and improved error correction capability." *Id.* at 9:66-10:2. If TCM encoder (42) in Figure 7 already contained an integrated coding and modulation scheme, then this section of the specification would be superfluous.

Finally, the Defendants' own briefing supports a finding that TCM encoder (42) does not include a mapping function. As noted by Defendants, convolutional coding produces "a stream of bits that can subsequently be interleaved . . . ." Defendants' Opposition Brief, 6:06-cv-551, Docket No. 374 at 9 ("Defendants' Opposition"). Modulation occurs downstream where the mapping function converts the sequence of coded bits into "waveforms suitable for the analog signals that are actually transmitted." *Id.* Mapping is "independent from the convolutional coding scheme." *Id.* The output of a Trellis Coded Modulator is "a sequence of symbols or signal points in a signal constellation map, each of which is represented by two or more bits. . . . In contrast, the output of a convolutional encoder is a stream of bits, not symbols representing signal points in a constellation." *Id.* at 10. A TCM device produces "coded symbol sequences." *Id.* at 9. Defendants' explanation

is consistent with the di-bit interleaver (43) and the QSPK encoder (44) residing downstream of the TCM encoder (42) if the "42" encoder does not contain its own mapping function.

Given the context provided in the specification, the "rate ½ TCM encoder" described in Block 42 of Figure 7 does not necessarily have to contain a mapping function in order to achieve DRE. Neither party disputes that a rate ½ TCM encoder must, at least, include some type of finite-state encoder in order to achieve FEC or DRE. *See* Defendants' Opposition, Bims Dec. at ¶ 48; Williams Dec. at ¶ 154; CSIRO's Reply Brief, 6:06-cv-551, Docket No. 391 at 3 n.2. Therefore, the corresponding structure for the term "means to apply [a] data reliability enhancement" for the purpose of §112 ¶6 equivalence is clarified and amended to be "the rate ½ finite-state encoder labeled 'rate ½ TCM encoder' described in block 42 of Figure 7 and referenced at column 6:32-46 regardless of any modulation function."

The Significant Ones of Non-direct Transmission Paths

Claims 10, 26, 42, 56, and 68 contain the limitation "Modulating Data into a plurality of sub-channels comprised of a sequence of data symbols such that the period of a sub-channel symbol is longer than a predetermined period representative of the time delay of significant ones of non-direct transmission paths" ("Symbol Period Limitation"). The Court has previously construed "the significant ones of non-direct transmission paths" to mean "reflected transmission paths with sufficient signal magnitude to impair the reception of transmitted symbols." Claim Construction Opinion at 27-28. Defendants' MSJ briefing asserts that this construction means that a symbol period must "avoid any impairment" of the reception of transmitted symbols by reflected transmission paths of sufficient signal magnitude. *See* Defendants' Opposition, Bims Dec. at 13 ¶ 31. CSIRO vigorously contests this interpretation.

The Court's previous Claim Construction opinion neither requires nor suggests that a symbol period must "avoid all impairments." In fact, the Court was clear to note that "it is impossible to determine, for every potential environment, which multipath transmissions are significant and their associative delay times with any mathematical precision, and such a precise determination is not required to save the claims." Claim Construction Opinion at 26. Further, the Court explained that "a skilled artisan would take the measured, calculated, or assumed predetermined period representative of the time delay of significant multipath transmissions and design the sub-channel symbol duration to maintain a minimum [bit-error-rate] in *near* worst-case environments." *Id.* at 27.

One skilled in the art would not understand the symbol period limitation to require that a symbol period be long enough to "avoid any impairment" in the reception of transmitted symbols. Rather, in explaining its solution to the multipath problem, the specification recites that "typical time delays due to multipath transmissions are of the order of 50 ns because of the dimensions of typical rooms." '069 Patent at 8:38-40. Accordingly, one skilled in the art would understand that the symbol period must be of sufficient length to avoid impairment in *typical* indoor environments. Thus, the definition of "the significant ones of non-direct transmission paths" is clarified and amended to mean "reflected transmission paths with sufficient signal magnitude to impair the reception of transmitted symbols in typical indoor environments."

CONCLUSION

The Court provides this supplemental claim construction to resolve the parties' claim interpretation disputes raised in their MSJ briefings and interprets the claim language in this case in the manner set forth above. For ease of reference the complete and amended claim constructions are set forth in a table as Appendix A. CSIRO's MSJ is **DENIED AS MOOT** and the issues raised

therein will be revisited at an appropriate time during trial in light of the evidence and arguments presented.

So ORDERED and SIGNED this 3rd day of April, 2009.

LEONARD DAVIS
UNITED STATES DISTRICT JUDGE

APPENDIX A

Ref. Nos.	Term or Phrase to be Construed (Claims)	Court's Construction
1	confined multipath [transmission] environment [of radio frequencies] (claims 10, 26, 42, 68)	an indoor environment
2	[peer-to-peer] wireless LAN (claims 10, 11, 12, 13, 14, 15, 16, 26, 27, 28, 29, 30, 31, 32)	*No construction required*
3	antenna means (claims 10, 26, 32,42, 48, 68)	a structure for radiating or receiving radio waves
4	means to apply [a] data reliability enhancement (claims 10, 26, 42)	Function: to apply a data reliability enhancement to said data passed to said modulation means Structure: the rate ½ finite-state encoder labeled 'rate ½ TCM encoder' described in block 42 of Figure 7 and referenced at column 6:32-46 regardless of any modulation function.
5	blocks (claims 10, 26, 42, 68)	a block of data having one or more bits
6	significant ones of non-direct transmission paths (claims 10, 26, 42, 68)	reflected transmission paths with sufficient signal magnitude to impair the reception of transmitted symbols in typical indoor environments
7	transmission signal processing means (claims 10, 16, 26, 32, 42, 48, 68)	*No construction required*
8	modulation means for modulating input data of said input data channel into a plurality of sub-channels comprised of a sequence of data symbols such that the period of a sub-channel symbol is longer than a predetermined period representative of the time delay of significant ones of non-direct transmission paths (claims 10, 26, 42, 56, 68)	Function: modulating input data of said input data channel into a plurality of sub-channels comprised of a sequence of data symbols such that the period of a sub-channel symbol is longer than a predetermined period representative of the time delay of significant ones of non-direct transmission paths. Structure: the Complex FFT (Fast Fourier Transform) Based Modulator in block 32 of Figure 6, executing the 16 Point Complex IFFT (Inverse Fast Fourier Transform) of block 47 of Figure 7, as referenced at column 6:23-31.